

CLAIMS

1. High strength galvanized steel sheet excellent in workability, comprising high strength steel sheet containing, by mass%,

C: 0.05 to 0.15%,

Si: 0.3 to 2.0%,

Mn: 1.0 to 2.8%,

P: 0.03% or less,

S: 0.02% or less,

Al: 0.005 to 0.5%, and

N: 0.0060% or less and

a balance of Fe and unavoidable impurities, where, when %C, %Si, and %Mn respectively represent the C, Si, and Mn contents, $(\%Mn)/(\%C) \geq 12$ and $(\%Si)/(\%C) \geq 4$ being

satisfied, on the surface of which having a galvanized layer containing Al: 0.05 to 0.5 mass% and Fe: 5 to 15 mass% and a balance of Zn and unavoidable impurities, said steel sheet satisfying a relationship of tensile strength F (MPa) and elongation L (%) of $L \geq 52 - 0.035 \times F$.

2. A method of production of high strength galvanized steel sheet excellent in workability comprising finish rolling a slab of a composition of chemical ingredients as set forth in claim 1 at a temperature of at least an A_{r3} point, cold rolling it by 50 to 85%, then annealing it in a continuous hot dip galvanizing facility in the 700°C to 850°C ferrite and austenite two-phase temperature region, cooling it from its maximum peak temperature to 650°C by an average cooling rate of 0.5 to 10°C/sec, then from 650°C to 500°C by an average cooling rate of 3°C/sec or more, holding it from 500°C to the coating bath for 30 seconds to 240 seconds, then hot-dip galvanizing it so as to form on the surface of said cold rolled steel sheet a hot-dip galvanizing layer, then alloying said steel sheet formed with said hot-dip galvanizing layer so as to produce a galvanized steel sheet comprised of said steel sheet

formed on its surface with a galvanized layer,

said method of production of high strength galvanized steel sheet excellent in workability characterized by performing said hot-dip galvanizing in a hot-dip galvanizing bath of a composition of ingredients comprised of an effective Al concentration in the bath of 0.07 to 0.105 mass% and a balance of Zn and unavoidable impurities and performing said alloying at a temperature T (°C) satisfying:

$$225+2500 \times [\text{Al}\%] \leq T \leq 295+2500 \times [\text{Al}\%],$$

where, [Al%]: effective Al concentration in bath in zinc coating bath (wt%).

3. A method of production of high strength galvanized steel sheet excellent in workability as set forth in claim 2, said method of production of high strength galvanized steel sheet characterized by being performed at an effective Al concentration in the bath satisfying

$$[\text{Al}\%] \leq 0.103 - 0.008 \times [\text{Si}\%]$$

where [Si%]: Si content in steel sheet (wt%)

4. A method of production of high strength galvanized steel sheet excellent in workability as set forth in any one of claim 2 to claim 3, said method of production of high strength galvanized steel sheet characterized by making a time after hot dip galvanizing coating until cooling to 400°C or less 10 seconds to 100 seconds.

5. A method of production of high strength galvanized steel sheet excellent in workability as set forth in any one of claim 2 to claim 4, said method of production of high strength galvanized steel sheet characterized by making the temperature of the hot-dip galvanizing coating bath less than 460°C.

6. A method of production of high strength galvanized steel sheet excellent in workability as set forth in any one of claim 2 to claim 5, said method of

production of high strength galvannealed steel sheet characterized by annealing the sheet, then cooling it to 450°C or less, then reheating it to a temperature over 450°C and hot-dip galvanizing it.